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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,309	07/01/2002	Kevin F. King	Gems0174/YOD	6408
28046	7590	04/07/2004	EXAMINER	
FLETCHER, YODER & VAN SOMEREN P. O. BOX 692289 HOUSTON, TX 77269-2289			SHRIVASTAV, BRIJ B	
			ART UNIT	PAPER NUMBER
			2859	

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/064,309

Applicant(s)

KING ET AL.

Examiner

Brij B Shrivastav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37 and 38 is/are allowed.
- 6) ☒ Claim(s) 1,3-12,14-18,21-27 and 30-35 is/are rejected.
- 7) ☒ Claim(s) 2,13,19,20,28,29 and 36 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

1. Applicant's response dated January 23, 2004 has been received and entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1, 3-10, 22-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kellman et al (WO 03/032816), and further in view of Hajnal et al (US 6,380,741).

As regards to claim 1 and 22, Kellman et al teach a method and a system for estimating coil sensitivities in a magnetic resonance imaging system by locating an edge pixel within a column or a row of a magnetic resonance image (figure 4, page 10, also see abstract for different regions, in the present case the different region is edge pixel). However, Kellman et al do not specifically teach calculating a coil sensitivity function for a pixel based upon two or more pixel inward of the edge pixel. Hajnal et al teach calculating a coil sensitivity function for a pixel based upon two or more pixel inward of the edge pixel (figures 1 and 2; columns 1-4, lines 32-67, 35-66, 1-7 and 30-57. It would have been obvious to one of ordinary skill in the art to adapt teaching of Hajnal with the teaching of

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Kellman et al to reduce imaging time and improving imaging efficiency and image quality.

As regards to claims 3-10, 23- 27, Kellman et al do not reach teach low resolution/calibration image, and the sensitivity function being a linear extrapolation wherein spacing distance of pixels separates edge and other pixels, and the analysis circuit calculating sensitivity function. Hajnal et al further teach low resolution/calibration image, and the sensitivity function being a linear extrapolation wherein spacing distance of pixels separates edge and other pixels, and the analysis circuit calculating sensitivity function (columns 3, 4, lines 1-34 and 46-49; figures 1,3 and 12). It would have been obvious to one of ordinary skill in the art to adapt teaching of Hajnal with the teaching of Kellman et al to further improving imaging efficiency and image quality.

3. Claims 11, 12, 14-18, 21, 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over King (US 6,559,642), and further in view of Hajnal et al (US 6,380,741).

As regards to claims 11 and 30, King teaches a magnetic resonance imaging method and system to generate an enhanced sensitivity matrix for a subject (figure 1). The scanner of the system generates a calibration image and the analysis circuit processes the image, and locating the object in a column or row (figures 1 and 3, columns 1-7). King does not specifically teach calculating a sensitivity function for two or more fitting pixels disposed inward of the edge pixel, and the analysis circuit processing the image by locating an edge pixel within columns or rows of the image; wherein a respective calculated sensitivity

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to each of one or more outer pixel disposed outward from the edge pixel is assigned from the calculated sensitivity function describing the coil sensitivity near the edge pixel. Hajnal et al teach calculating a sensitivity function for two or more fitting pixels disposed inward of the edge pixel, and the analysis circuit processing the image by locating an edge pixel within columns or rows of the image; wherein a respective calculated sensitivity to each of one or more outer pixel disposed outward from the edge pixel is assigned from the calculated sensitivity function describing the coil sensitivity near the edge pixel (figures 1 and 5, columns 2 and 3, lines 1-67 and 1-32; column 4, lines 1-57).

It would have been obvious to one of ordinary skill in the art to adapt method of Hajnal et al to calculate sensitivity function for two or more fitting pixels disposed inward of the edge pixel, and to assign sensitivity to each of one or more outer pixel disposed outward from the edge pixel to the system of King to decrease imaging time resulting in improved efficiency and image quality.

As regards to claims 12, 31 and 32, King further teaches location of threshold intensity value, and use of low-resolution calibration image (columns 1 and 2, lines 39-59, and 1-20).

As regards to claims 14-18, 21 and 33-35, King does not teach further analysis circuit using extrapolated sensitivity function or linear extrapolation and where the spacing space is one or more spacing pixel. Hajnal et al teach analysis circuit using extrapolated sensitivity function or linear extrapolation, and use of one or more pixel as spacing space (figures 1 and 5, see P1 and P2, numeral 10, column 2, lines 56-67). It would have been obvious to one of ordinary skill in the

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art to adapt Hajnal et al's teaching with the teaching of King to improve image resolution improving image quality.

1. Claims 2, 13, 19, 20, 28, 29 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2. Claims 37 and 38 are allowed, as the prior art of record does not teach or suggest a magnetic resonance imaging system, which is capable of generating an optimized image for a subject, where the scanner can generate diagnostic and calibration images, and has means to generate an enhanced sensitivity matrix to generate a corrected diagnostic image, in combination of the other limitations of the claims.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

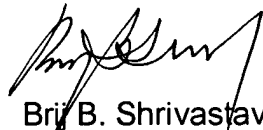
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B Shrivastav whose telephone number is 703-305-0649. The examiner can normally be reached on 7 AM to 4 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. F. Gutierrez can be reached on 703-308-3875. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Bbs
March 23, 2004



Brij B. Shrivastav
Patent Examiner